differences, the two types of effective tax rates cannot be readily compared.

The estimated user cost of capital is 18.9 percent for the oil industry. This is the real net operating profit (per dollar of capital) that an oil investment must generate in order to cover corporate taxes, economic depletion and depreciation, and provide investors with a real return of 8 percent.

Treasury I.   The middle panel of Table 8 shows effective tax rates by industry under the original set of Treasury tax reform proposals. They are calculated under the same set of assumptions as used under current law. Although the real after-tax return is likely to change with the adoption of any major tax reform package, for the purposes of this analysis, it is assumed that this return stays fixed at 8 percent.

The Treasury plan would have raised all industry effective tax rates to about 32 percent. The plan is based on the premise that effective tax rates should equal the statutory rate for all industries; this would largely be achieved under this proposal.67/

The oil and gas tax rate (25 percent) would remain below the all-industry average tax rate, although its increase would be quite substantial--about 15 percentage points. The rate would remain significantly below the statutory rate of 33 percent because some forms of investment would still be written off faster than the economic decline of the oil and gas properties. For example, dry hole costs and lease bonuses would be written off when a property was abandoned, even though they are required to discover or develop properties that prove productive. Under this proposal, no distinction would be made between integrated and independent companies for tax purposes.

The user cost of capital would rise from 18.9 percent to 20.7 percent. However, since domestic producers cannot affect the real price of oil in the world market, they cannot increase prices (by reducing output) to cover this higher cost. Instead, the higher taxes would probably lower the bonuses paid for oil-bearing land while maintaining a constant output price. Assuming depletable costs (bonuses) adjust instead of prices, the new depletable cost share under the Treasury proposal would be 11.2 percent instead of 20 percent of the initial investment.

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67. The Treasury (and this study) use estimates of economic depreciation reported in Charles R. Hulten and Frank C. Wykoff, "The Measurement of Economic Depreciation," in Charles R. Hulten, ed., Depreciation, Inflation and the Taxation of Income from Capital (Washington, D.C.: Urban Institution, 1981).

This reduction is about equivalent to a 5 percent decline in the current operating profit (equal to the user cost C) per barrel of oil.

The reduced bonus amount (or equivalent price decline) would be likely to affect domestic oil supply by making marginal oil properties no longer economic.[68/]   A 5 percent profit decline under Treasury I would reduce drilling and domestic reserves. In the first year, drilling might be reduced by about 3 percent to 3.5 percent, and reserve additions could decline by 0.4 to 0.8 percent.[69/] Production would only be slightly affected initially; after several years of reduced drilling and reserve finds, production would be more severely affected.

President's Proposal.   The bottom panel of Table 8 shows the effective tax rates under the President's proposals. The tax rate on oil and gas extraction remains about the same--it falls slightly from 10 percent to 8 percent.[70/] This indicates that the effect of repealing percentage depletion (which would raise the tax rate) is about offset by the reduction in the top statutory rate from 46 percent to 33 percent. As a result, the cost of capital for the oil and gas extraction business remains virtually unchanged. By contrast, the average tax rate on other industries declines from 29 to 24 percent.

This analysis suggests that the drilling and production effects of the President's proposals would likely be quite small. The equivalent price change under the President's plan is only $0.05 per barrel. Any change in drilling is likely to be less than 1 percent. The President's proposals would result in an

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68.   A property would become uneconomic if its bonus bid dropped below zero.

69.   Data Resources (DRI) reports results similar to those estimated here. (Data Resources, Inc., Analyzing the Effects of the Treasury Tax Reform Proposals on the Oil and Gas Industry.   Monitoring Bulletin (June 1985).)   In 1986, DRI estimates that a 9 percent drop in the price of oil would result in a 5 percent decline in footage drilled.   The implied price elasticity of drilling is about 0.53.   (In other words, a 1 percent change in the price of oil yields a 0.53 percent change in drilling activity.) In the model used here, the implied elasticity of drilling (total wells) with respect to the price of oil (evaluated in 1984) is about .61--slightly higher than estimated by DRI. A description of the model used to estimate drilling and reserves is available upon request.

70.   Given the uncertainty of the assumptions used in this model, this decline is insignificant.

effective tax rate on oil and gas extraction much below the average rate for other industries. For example, the tax rates on manufacturing and on wholesale and retail trade would be 27 percent and 29 percent, respectively. This indicates that, relative to investment in other industries, new investment in oil and gas extraction would remain relatively tax-preferred.

Extending the repeal of percentage depletion to all wells-- including stripper wells--in the President's tax plan would have only a negligible effect on marginal tax rates or on oil production. The effect would be virtually insignificant because the decision to invest in new oil properties is unlikely to be affected by a tax benefit that is relatively small and is only received late in a property's life. Furthermore, as noted above, the 50 percent net income limitation would lower the benefit received on stripper wells to zero as they neared their economic limit.

Partial Changes. Other less comprehensive tax changes have also been suggested for the oil and gas industry. These proposals would not completely restructure the current tax system, but would simply alter the way intangible drilling costs or percentage depletion are handled under current law.

Repealing percentage depletion and requiring all producers to use cost depletion (unindexed) would raise the average effective tax rate from 10 percent to 13 percent. The tax rate on integrated companies would remain unchanged at about 13 percent, and the rate on independent companies would rise from -10 percent to 11 percent. This change would be equivalent to lowering the real operating profit per barrel by about 1 percent. Such a change would have the effect of lowering drilling by about 0.6 percent and reserve additions by a smaller amount.

Requiring producers to amortize their drilling costs over 60 months would have a much larger effect.71/ This change would affect all oil producers and have the effect of raising the industry's effective tax rate from 10 percent to 22 percent. This new tax rate would remain slightly below the average rate that currently prevails in other industries. Such a change would be equivalent to lowering the real operating profit by about 4 percent per barrel. It would result in reduced drilling of about 2 to 2.5 percent annually, and in reduced reserve additions of about 0.3 to 0.6 percent.

These effects would be even more severe if producers were required to use cost depletion (unindexed) instead of 60 month

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71. This assumes companies would only amortize drilling costs for productive wells; dry hole costs would still be expensed.

amortization for their drilling costs. In this case the effective tax rate would rise to about 34 percent. This change would be about equivalent to lowering the real operating profit by about 9 percent. The effect on drilling in this case would be a reduction of around 5.5 percent; reserve additions would decline by 0.7 percent to 1.4 percent.

REVENUE ESTIMATES

Revenue estimates from changing certain oil and gas provisions are shown in Table 9. Over the 1986 to 1990 period, repealing percentage depletion altogether would raise about $5.8 billion. In lieu of percentage depletion companies would be allowed to deduct their depletable costs according to cost depletion under current law. This estimate compares to the estimate of $4.5 billion for the repeal of all percentage depletion, except for stripper wells (as proposed by the President).

Under current law, cost depletion is less generous than economic depletion. This is because cost depletion is not indexed for inflation and the value of future deductions is severely eroded even in times of moderate inflation. One alternative to current law cost depletion that has been proposed is to allow producers depletion at a constant rate of 25 percent of the property's current tax basis.72/   (The current tax basis is the historical value of the firm's depletable costs associated with the property, less all prior deductions for depletion.)   For example, if a firm originally spent $1,000 for a property, its first-year deduction would be $250.   In the second year, the current tax basis would be $750 and that year's depletion deduction would be $187.5 (.25 times $750).   This process would continue until the property was abandoned, at which time the remaining basis would be written off.

Adoption of the constant rate depletion proposal would accelerate depletion deductions and therefore lose revenue. Over the 1986 to 1990 period, the revenue loss from this proposal is about $2.5 billion. This assumes that percentage depletion is already repealed and that both independents and integrated companies would be required to use the constant rate system. In conjunction with repealing all percentage depletion, this would result in a net revenue gain of about $3.3 billion over the 1986 to 1990 period.

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72. This proposal is in the tax reform bill introduced by Senator Bill Bradley and Congressman Richard Gephardt (H.R. 800, S. 409).

TABLE 9.   REVENUE EFFECTS FROM CHANGES IN OIL AND
GAS TAX PROVISIONS

Addition to CBO Baseline	Annual Added Revenues (Billions of dollars)					Cumulative Five-Year Addition
	1986	1987	1988	1989	1990	
Repeal All Percentage Depletion (except stripper wells) a/	0.5	1.0	1.0	1.0	1.1	4.5
Repeal All Percentage Depletion a/	0.7	1.2	1.3	1.3	1.4	5.8
Accelerate Cost Depletion b/	-0.4	-0.7	-0.6	-0.5	-0.4	-2.5
Capitalize Drilling Costs (25 percent constant rate depletion) c/	2.5	4.0	3.4	2.9	2.6	15.3
Amortize Drilling Costs Over 60 Months c/	2.6	4.2	3.5	2.7	1.8	14.8

SOURCES: Joint Committee on Taxation and Congressional Budget Office.

a.   Percentage depletion is replaced by current law cost depletion.

b.   Current law cost depletion is replaced by constant rate depletion (25 percent annual rate).

c.   This estimate assumes that all percentage depletion has been repealed.

Eliminating the provision for expensing intangible drilling costs for producing wells could raise $15.3 billion over the 1986 to 1990 period.73/   Under the proposal, firms would be required to capitalize their drilling costs and add them to their depletable basis (that is, the aggregate of all depletable costs).   They would then be allowed subsequent deductions according to constant rate depletion (at a 25 percent rate).

The simultaneous repeal of both percentage depletion (in total) and the expensing of intangible drilling costs would raise about $18.6 billion over the 1986 to 1990 period.   Companies would instead be allowed to deduct these costs according to constant rate cost depletion.   All depletable costs would also be subject to depletion under the constant rate system.

If elimination of the expensing of IDCs was not accompanied by the repeal of percentage depletion, independent companies might be especially hard hit since they would lose the ability to expense their drilling costs, but might not be able to realize higher depletion deductions.   This would happen if their current percentage depletion deductions exceeded their deductions (based on cost depletion) resulting from capitalizing their drilling expenditures.   One way of allowing firms to retain percentage depletion and realize some benefit from capitalizing their drilling expenditures would be to allow all companies to amortize their drilling expenditures over five years, regardless of their deduction for percentage depletion.   Such a provision would raise $14.8 billion over the 1986 to 1990 period.

Extending the Windfall Profit Tax past 1991 would raise a relatively small amount of revenue.   CBO now estimates that the tax would yield net revenue on the order of about $1.1 billion per year by 1990.   Even if oil prices were to stay constant in real terms, this amount would gradually decline over subsequent years.   By the year 2000, the annual net revenue yield from the tax would be about $450 million.

Increasing the tax on new oil from its current level (22.5 percent now, declining to 15 percent by 1989), back up to its original level of 30 percent would have a negligible revenue effect over the 1986 to 1990 period.   This is due to the fact that much of new oil is now exempt from the tax because its adjusted base price exceeds its market price, and its windfall profit is therefore zero.   Changing the tax rate would have little or no impact on collections because the tax base has declined to almost nothing.

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73.   This estimate assumes that percentage depletion has already been repealed.

THE EFFECTS OF TAX POLICY ON THE USER COST OF CAPITAL

A simple cost of capital model was used to analyze changes in tax policy. In a world without taxes, the real operating profit per barrel must be enough to cover the real return required by the investor plus economic depreciation.73/ On the marginal investment, the real profit equals the cost of capital. (The cost of capital is the real return plus economic depreciation plus taxes.) As discussed in the text, the formal expression for the cost of capital is:

$$(1) \quad C = q(r^* + d)(1 - uz - k)/(1 - u)$$

Where: C = operating profit per barrel (or user cost of capital)

q = investment amount

r^* = required after-tax return

d = economic depreciation rate (production decline rate)

u = corporate tax rate

z = present value of tax depletion and depreciation, evaluated at the nominal after-tax interest rate

k = investment tax credit rate

The pretax rate of return equals the user cost less economic depreciation ($r = C - d$), and the effective tax rate equals the difference between the pretax and after-tax rates of return divided by the pretax rate of return ($TR = (r - r^*)/r$).

Under current law, the present value of depletion and depreciation deductions consists of a number of factors that represent different components of an oil investment. In this model, it is assumed that the investment is composed of depletable costs (20 percent), drilling costs (69 percent), and depreciable costs (11 percent). Of the depletable costs, it is assumed that 60 percent are capitalized and recovered through depletion, and the remaining 40 percent are associated with properties that prove worthless; they are deducted after one year. Thirty percent of drilling costs are assumed to be for dry wells; the other 70 percent are for producing wells. Under these assumptions, the present value of deductions for the integrated company equals:

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73. The real operating profit per barrel is the selling price less all current production costs, such as labor or energy needed to extract and sell the production.

(2) $z = 0.2[0.6(d/(d + r^* + p) + 0.4/(1 + r^* + p)]$
$+ 0.69 [0.3 + 0.7(am)] + 0.11(dep)$

Where: dep = Present value of depreciation plus the invest-
ment tax credit (on a deduction equivalent
basis

am = Present value of amortized drilling costs

p = Expected rate of inflation

The first term in this expression is the present value of
deductions related to depletable costs. The present value of
depletion under an unindexed depletion system is equal to $d/(d +$
$r^* + p)$, where p is the expected rate of inflation.[74] The
expression ".4/(1 + r^* + p)" reflects the assumption that 40
percent of depletable costs are written off after one year due to
abandonment. The second term represents the deductions for
drilling costs. Since 20 percent of the costs related to produc-
tive wells must be amortized over three years, the term (am) is
somewhat less than one. The last term represents the present
value of depreciation and the investment tax credit. The values
of these terms change as the tax treatment of each of the compon-
ents is altered.

The cost of capital for an independent company is somewhat
different than that for an integrated company because of the
effect of percentage depletion. The expression for the inde-
pendent company is:

(3) $C = (r^* + d)(1 - uz)/[(1 - u) + .1875u]$

The term ".1875u" reflects the value of percentage depletion. The
percentage depletion rate is 0.15 and it is assumed that the ratio
of price to operating profit (C) equals 1.25.[75] In this case,
the z term excludes the present value of cost depletion. It
equals:

(4) $z = 0.2[0.4/(1 + r^* + p)] + 0.69[0.3 + 0.7] + 0.11(dep)$

This expression has also been modified to reflect the fact that
independent companies are not required to amortize any of their
drilling expenses, but may write them all off immediately.

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74. This formulation assumes that cost depletion deductions
    accrue continuously over time (at the same rate production
    declines). The present value of deductions under indexed
    cost depletion would be $d/(r^* + d)$.

75. $0.1875 = (0.15)(1.25)$.

Under the assumptions that the decline rate equals 10 percent, expected inflation equals 4 percent, and the real return is 8 percent, the cost of capital (C) equals 19.3 percent for the integrated company. In 1984, the real (1972 dollars) operating profit was estimated at about $8 per barrel. This implies that the real investment amount (q) per barrel of reserves equals about $4.2 per barrel.76/

The industry cost of capital is equal to 18.9 percent and reflects a weighted average of integrated companies (80 percent) and independent companies (20 percent).

Changes in tax policy will affect the cost of capital by changing the present value of tax deductions. If it is assumed that the real after-tax return is fixed at 8 percent, and that the cost of capital can adjust (through price changes), a new cost of capital can be computed for each new tax regime. Alternatively, if it is assumed that the output price remains fixed, it is possible to solve for the new cost of capital by letting the scale of the investment adjust. Specifically, by altering the share of depletable costs (that is, lease bonuses), and holding the after-tax return constant, a new cost of capital can be calculated.

For example, suppose the expensing of intangible drilling costs (for productive wells) is replaced by unindexed cost depletion. In this case the new z (for the integrated company) is the same as the old, except that the present value of amortization (am) instead equals the present value of cost depletion $(d/(d + r^* + p))$. If prices are allowed to adjust (holding the after-tax return fixed at 8 percent), C would rise to 22.9 percent and the composition of the investment would remain unchanged. Alternatively, if prices remain fixed at their pre-change level, the depletable cost share (bonus) must fall from 20 percent to 5 percent. In this case, the cost of capital rises to 22.2 percent, but less capital is invested per unit of output.

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76. In this case, reserves would be 10 barrels (1/0.1) and the investment per barrel of reserves would be about $4.2 in 1972 dollars ($9.3 per barrel in 1984 dollars). For reference, it has been reported that the ratio of exploration and development expenditures per barrel of reserve additions for the domestic oil industry was $9.90 in 1981, and $11.14 in 1982. See, Energy Information Administration, Performance Profiles of Major Energy Producers, 1983 (February 1985), Table G35.

This reduction in depletable costs is equivalent to a fall in C (under current tax law) from 18.9 percent to 17.2 percent.[77]

In this case, C falls by about 9 percent. Evaluated at a pre-change real operating profit of $8.13, this implies an equivalent reduction in the real profit per barrel of about $.72 ($1.58 in 1984 dollars). In this way, changes in tax policy can be translated into equivalent changes in the real profit per barrel--the variable used in the supply model to estimate the supply response from changes in oil prices or taxes.

Clearly these results depend on the assumptions used; different assumptions would result in somewhat different results. For example, if the initial calibration of q was based on a real after-tax rate of return (r*) of 5 percent, the drop in C would be $0.60 (in real terms) for the case of unindexed cost depletion compared to the $0.72 calculated under the 8 percent real return. By contrast, if the decline rate was set at 15 percent instead of 10 percent (but returning r* to 8 percent), the decline in C under unindexed cost depletion would be $0.44 instead of $0.72. Thus, the estimated change in C (and therefore the effect of tax policy changes) is quite sensitive to the set of assumptions used.

Effective tax rates for different policy regimes are also different under different assumptions. Effective tax rates by industry (comparable to those shown in Table 4 of the text) are shown in Table A-1 based on the alternative assumption of a 5 percent real return, holding all else the same. Under current law, the effective tax rate is virtually unchanged for the oil and gas extraction industry, but is higher for other industries. The oil and gas rate remains 10 percent, but the other industry rate is now 27 instead of 29. This indicates that at higher real returns, the tax preference in favor of the oil and gas industry is somewhat larger.

Under the Treasury proposal, the industry tax rates hardly change at all. This is because the Treasury proposal attempts to approximate economic depreciation rates in setting its tax depreciation rates. (If economic depreciation is allowed for tax purposes, the tax rate is invariant with respect to the discount rate.)

The tax rates under the President's plan are also very similar to those calculated at a 5 percent real return. The oil and gas rate remains 8 percent, and the other industry rate is 22

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77. 17.2 percent is computed by substituting the new lower depletable cost share into the cost of capital equation under current law and solving for the new cost of capital which equals the real profit per unit of output.

TABLE A-1.   EFFECTIVE TAX RATES AND REAL USER COSTS OF
CAPITAL UNDER CURRENT LAW AND REFORM PROPOSALS:
5 PERCENT REAL DISCOUNT RATE (In percents)

Industry	Real User Cost of Capital	Required Pretax Return	Effective Tax Rate
Current Law			
Manufacturing	16.2	7.3	31
Construction	19.0	7.0	29
Transportation	13.6	5.7	12
Communications	12.9	5.5	9
Public Utilities	11.6	6.1	19
Wholesale and Retail Trade	16.9	7.9	37
Services	15.9	6.1	18
Average Rate	15.9	6.8	27
Oil and Gas Extraction	15.5	5.5	10
Treasury Proposal			
Manufacturing	16.3	7.4	32
Construction	19.4	7.4	32
Transportation	15.0	7.1	30
Communications	14.3	6.9	28
Public Utilities	12.9	7.4	32
Wholesale and Retail Trade	16.3	7.3	32
Services	17.1	7.3	32
Average Rate	16.3	7.3	31
Oil and Gas Extraction	16.6	6.6	25
President's Proposals			
Manufacturing	15.7	6.8	26
Construction	18.8	6.7	25
Transportation	18.9	6.0	17
Communications	13.4	5.9	15
Public Utilities	11.4	5.9	15
Wholesale and Retail Trade	15.9	6.9	28
Services	16.2	6.3	20
Average Rate	15.6	6.4	22
Oil and Gas Extraction	15.4	5.4	8

SOURCE: Congressional Budget Office.

NOTE: Tax rates are computed under the assumptions that financing is 100
percent equity·and all deductions and credits can be taken on a current
basis. The real required return is assumed to be 5 percent; expected
inflation is assumed to be 4 percent. The taxpayer is a corporation
with a marginal tax rate of the top corporate tax rate. Taxes paid by
individual shareholders on dividends and on capital gains are not
counted in the calculation. The tax rate is the corporate income tax
rate only.

percent (versus 24 percent). This indicates that the estimated difference in taxation between the oil industry and other industries under the President's proposal is slightly smaller if a lower real required after-tax return is assumed.